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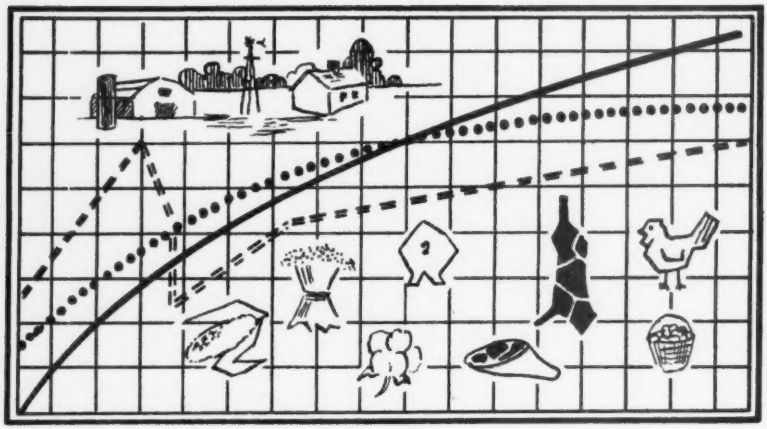

SPECIAL REPORTS

Depreciation

Role of Labor in the Small Plant

Land Ownership in Oklahoma

September, 1961

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Oklahoma Current Farm Economics

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Depreciation

Clark Edwards

Decisions about buying, selling, or using farm resources that have a useful life of more than one year always involve considerations of depreciation. It is important that we understand what is meant by depreciation of tractors, barns, and other durable factors of production.

Meaning of Depreciation

Depreciation problems perplex us because the word "depreciation" is ambiguous: One meaning relates to the physical usefulness of the asset over time and the other relates to annual costs of ownership.

The meaning for depreciation which is concerned with usefulness is illustrated by the wearing down of the tread on a truck tire, the rubbing of rings against piston walls, and the rotting away of timbers in the barn loft. Economists call this the slow using up of a long lived asset. It is a using up that necessarily takes place in spite of good care, maintenance, or repair.

The meaning for depreciation which is concerned with costs of assets rather than with the assets themselves is illustrated by the depreciation allowance claimed as an income tax deduction each year. This kind of depreciation is a reasonable monetary allowance for the exhaustion, wear and tear, and obsolescence of property used by the farmer in his business. The allowance is that part which might be set aside at the end of each year (or accounting period) so that the aggregate of the amounts set aside, plus the salvage value, will, at the end of the estimated useful life, equal the initial cost. The allowance provides for a recovery of the initial investment in a reasonable length of time.

Admittedly, the depreciation expense as a tax deduction for using a combine or a bulk tank for one year need not reflect the actual wear and tear on the equipment. The two concepts of depreciation are related to one another by purchase price at acquisition and by salvage value at disposal, but there is no need for the two kinds of depreciation schedules to correspond to one another at the close of each accounting period during the useful life of the asset.

The conception of depreciation as the slow using up of a long lived asset is important to the farmer in determining the value of equipment he uses. For example, he can estimate how much work a certain kind of tractor will do and how long it may be expected to do it.

The conception of depreciation as a reasonable allowance for the recovery of investment during the period of ownership is important to the farmer in deciding whether or not to own and use an asset and in keeping financial records of the asset during the period of ownership.

The allowance may be regarded as a schedule of annual expenses associated with asset ownership over the useful life. In deciding whether to buy an asset, as well as when to sell, this schedule can be compared with the schedule of declining use value associated with physical depreciation and with a schedule of declining salvage values on the second-hand market.

In addition to use in making farm management decisions, the schedule of annual expenses becomes a part of the farm records. The expenses appear on the profit and loss statement of the business and are reported on income tax returns. They are also used in estimating net worth, or equity in the business, since accumulated depreciation expenses may be deducted from initial acquisition cost to show present book value. The book value becomes a part of the balance sheet showing assets, liabilities, and net worth.

Useful Life

The concept "useful life" of a durable resource takes on different meanings when used in connection with the two depreciation concepts. When the term useful life is considered relative to the slow using up of a long lived asset it means, simply, a measure of how long it would take for the asset to become useless. The measure may be in terms of years, as when we say a barn has a useful life of fifty years; it may be

in terms of hours of use as when we say a feed grinder has a useful life of 5,000 hours; or it may be in terms of rate of use as when we say a truck tire has a useful life of 25,000 miles.

When the term useful life is considered relative to reasonable recovery of investment, the time period usually is shorter than required for the asset to become useless. Several considerations might provide for a reasonable recovery period which is shorter than the useful physical life. Frequently a farmer intends to dispose of machinery before it is worn out. If he intends to trade in his tractor on a new one in four years, and the tractor has a physical life of 12 years, he may prefer to set it up on a four year depreciation schedule rather than a 12 year one. Of course, in doing this, he will depreciate it toward the salvage value expected in four years and not the relatively lower salvage value expected in 12 years.

Sometimes the farmer's planning horizon is less than the useful physical life of new equipment. If he buys a bulk milk tank with a physical life of 15 years and if he expects to stop milking cows in 10 years, then he may prefer to use a depreciation schedule which recovers his investment in a 10 year period.

Rapid depreciation schedules protect the farmer against obsolescence. Equipment becomes obsolete when the opportunity cost of keeping it in service exceeds its value in use. The opportunity cost, here, reflects the cost of failure to adopt new and better ways of doing what the old equipment was designed to do. Rapid depreciation schedules are sometimes used as protection against risk of some adverse event as, for example, falling salvage values due to a declining second-hand market. Finally, it is frequently advantageous for farmers to depreciate machinery and equipment as fast as the federal tax laws allow.

Depreciation Methods

There are several methods for assigning depreciation schedules to durable resources. The best method varies with the farmer's objectives. If the purpose of the schedule is to facilitate managerial decisions about what equipment to buy and when to sell used equipment, a simple straight-line schedule over the manager's planning horizon is usually satisfactory. If the purpose is to approximate the slow, physical using up of a long lived asset, in order to create realistic approximations of

value on balance sheets and profits statements, then some very complicated schedules may evolve indeed. If the purpose is to keep track of finances sufficiently well to pay the legal minimum income tax, then the legally maximum rate of depreciation may become the guide.

Three methods for assigning depreciation schedules have become popular in recent years due, in part, to the attention they have received in federal income tax literature. The three methods are known as (1) the straight-line method, (2) the sum of the digits method, and (3) the declining balance method.[1] To illustrate the three methods let us use as an example a tractor which has been purchased for $2,400 with an expected salvage value of $240 after eight years of useful life.

Straight-Line Method. The straight-line method is so called because a graph representing the decreases in book value over time is a straight line (Figure 1). For this method, the depreciation expense per year is

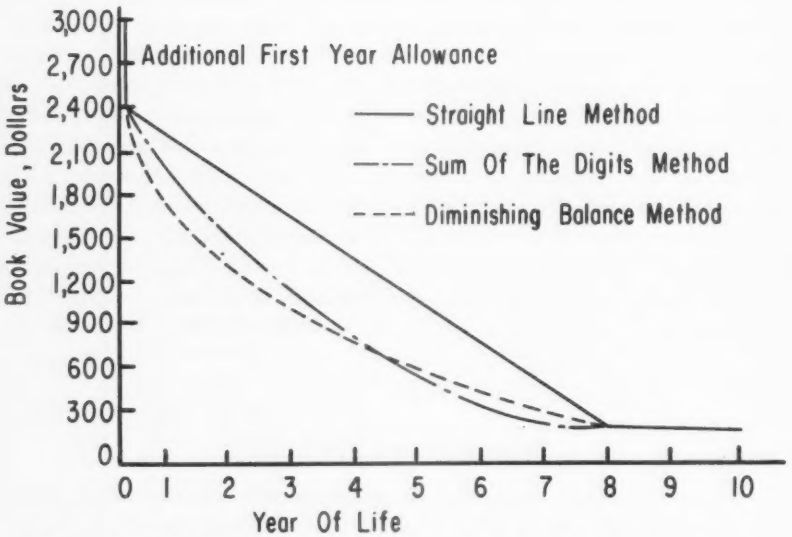

Figure 1. A Graphic Comparison of Three Popular Depreciation Methods

[1]For a detailed explanation of the three methods see Farmers Tax Guide, U. S. Treasury Department Internal Revenue Service Publication No. 225.

constant through the life of the property. For the other two methods, the depreciation expense is relatively larger in the early years and smaller in the latter years of useful life (Table 1).

The amount to be recovered over the useful life in our example is the acquisition cost ($2,400) less salvage value ($240), or $2,160. The amount recovered each year is one eighth of $2,160, or $270. With a constant annual depreciation expense of $270, the book value of the tractor is $2,130 at the end of the first year. It is reduced at a constant rate until it reaches the $240 salvage value at the end of the eighth year (Table 1).

Table 1.—A Tabular Comparison of Three Depreciation Methods.

Years of Life	Straight Line	Sum of Digits	Diminishing Balance
	Annual Depreciation Expense		
1	270	480	600
2	270	420	450
3	270	360	338
4	270	300	253
5	270	240	190
6	270	180	142
7	270	120	107
8	270	60	80
	Book Value		
0	2,400	2,400	2,400
1	2,130	1,920	1,800
2	1,860	1,500	1,350
3	1,590	1,140	1,012
4	1,320	840	759
5	1,050	600	569
6	780	420	427
7	510	300	320
8	240	240	240

The Sum of the Digits Method. The sum of the digits method is so called because the annual depreciation expense depends upon the sum of the years of useful life. In our example, the digits from one to eight sum to 36. The $2,160 is to be recovered through annual depreciation is divided into 36 equal parts of $60 each. The procedure is to recover eight of these parts, or $480 the first year, seven parts, or $420 the second year, and so on until there is but $60 left to recover in the final year leaving a book value equal to the designated salvage value of $240 at the end of the eighth year.

The Declining Balance Method. This method is sometimes referred to as the diminishing balance, or reducing balance method. It is so called because a constant annual rate of depreciation is applied to the declining book value of the asset. For income tax purposes, the rate of depreciation on new equipment is twice the rate of straight-line depreciation. For used equipment it is 1½ times the straight-line rate. In our example, the straight line rate is ⅛th of the depreciable investment per year. The diminishing balance rate is twice ⅛th, or ¼th, of the remaining book value. (If the tractor were second-hand, the diminishing balance rate would be 1½ times ⅛th, or 3/16ths.) Hence, the depreciation expense for the first year is ¼th of $2,400, or $600, leaving a book value of $1,800. The depreciation expense for the second year is ¼th of $1,800 or $450 (Table 1).

In this example, it happens that the book value at the end of the eighth year (rounded off to the nearest whole dollar) is $240, or precisely the salvage value assumed in the example. This is a coincidence and will not be repeated in most applications of the diminishing balance method. Note that the salvage value of $240 does not enter directly into the computations for the diminishing balance method as it does for the other other two methods discussed above. In practice, if the designated salvage value is not reached in the required number of years, additional depreciation is taken year by year at the constant percentage of remaining book value until the salvage value is finally attained. If, on the other hand, the designated salvage value is attained in less than the required number of years, no further depreciation is claimed for the remaining years of useful life, and the asset is carried at salvage value on the books.

Tax Laws Restrict Choice of Method. The straight-line method of depreciation is the easiest to use and is always allowable for income tax purposes. Tax laws restrict the use of the other schedules according to the length of useful life and to whether the equipment is new or used.

Used equipment with a life of three or more years may be depreciated by the straight-line method or by the diminishing balance method. If the latter is used, it is to be at 1½ times the straight-line rate. New equipment with a life of three or more years may be depreciated by any of the three methods; if the diminishing balance method is used, it may be at twice the straight-line rate for tax purposes.

Additional First Year Depreciation

Under certain conditions discussed in the Farmers Tax Guide, an additional first year depreciation is sometimes allowed on new or used tangible personal property with a life of six or more years. If the conditions are met, the farmer may deduct 20 percent of the acquistion cost as a depreciation expense during the first year in addition to the ordinary first year depreciation.

Let us change our example to suppose the purchase price of the tractor was $3,000. Then the additional first year depreciation is 20 percent of $3,000, or $600, leaving a book value of $2,400. The remaining book value less salvage value is the investment to be recovered through annual depreciation charges according to the usual methods and listed in Table 1. If the straight-line method is used, the total depreciation expense for the first year on a $3,000 tractor with an eight year life is $870. This is $270 for the ordinary first year depreciation and $600 for the additional depreciation.

Depreciation and Taxes

Depreciation and income taxes are related to one another because (1) tax requirements provide some of the motivation for keeping track of depreciation on durable farm assets and (2) tax laws have influenced the methods and rates of depreciation used by farmers. Because of these interactions, it might be well to mention the effect of choices about depreciation schedules on annual tax payments.

The overall managerial objective with respect to income taxes may be taken to be maximum personal income after taxes over time. Given the best farm organization for this purpose, the farmer may seek the minimum legal income tax payment with respect to choices about depreciation schedules. Two depreciation strategies worthy of consideration in this regard are (1) coordinating acquisitions of new machinery and equipment with years of high income and (2) fast tax write-offs.

Farmers with uneven incomes such that there are one or two good years followed by a run of bad years can save on income taxes by shifting income from the good years to the bad. One way to do this is to buy machinery and equipment during the good years and to declare as much first year depreciation as the income tax laws allow. If a new asset is set up on a six year schedule, then the first year depreciation, including the additional allowance and computed by the diminishing balance method, may be 46.67 percent of the acquisition cost. This can be used as an expense to offset high income in the year of purchase. Subsequent years of supposedly lower income will be accompanied by smaller depreciation expense.

Farmers with relatively even incomes from one year to the next will do as well to keep annual outlays for replacement of depreciable property relatively constant and to use straight-line depreciation as they will to adopt any other depreciation strategy.

Fast tax write-offs of depreciable property result in tax advantages when one is seeking capital with which to purchase such property, but may lead to corresponding tax disadvantages toward the end of the useful life of the property. Fast write-offs lower the tax basis and may result in more capital gains relative to ordinary gains when the asset is disposed of.

Fast write-offs can save money as failure to declare as much depreciation each year as is allowable by the federal tax laws may result in paying more than the legal minimum income tax. This is so because the tax laws state that depreciation may be deducted from initial basis to determine final basis for the purposes of capital gains computations to the extent that depreciation was either allowed or allowable, whichever is greater.

Role of Labor in the Small Plant

Kermit Bird

"Man cannot compete with machines"

"Mechanization will soon make human labor obsolete"

"Everything will be pushbutton by the year 2000"

"Never use a man for work a machine can do"

"The small plant is on the way out"

Since the beginning of automation these and similar statements have been echoed throughout the business and industrial world. All forms of communications, including trade and professional journals, have literally forced the idea upon entrepreneurs that plants failing to use the latest labor-saving devices and techniques are doomed to failure or financial loss. In many cases these statements have been accepted as codes of good management without proper investigation to determine the economic feasibility of decisions based upon them. Such generalizations are sometimes misleading and do not hold true under all conditions. In some instances they are actually harmful and result in firms going bankrupt. This is especially true of small businesses which in recent years have had a tendency to "join the bandwagon" without thoroughly understanding nor fulfilling the conditions needed for automation.

By following these statements, the owner of a small plant may be induced to tie up his capital in non-essential machinery. Other phases of the business may not receive needed investment stimuli because of

limited capital. Sound economics dictate that each dollar invested in a plant should be assigned where it yields the greatest return. If you are the owner of a small plant, don't be over-anxious to make the change to automation. It is quite possible to keep costs at a minimum by using human labor for many of the jobs in your plant.

There is enough truth in the statements, however, to make small firms take stock of their operations with the following questions: (1) How effective, costwise, is my present labor system? (2) Might a labor efficiency study lower costs? (3) Would costs be reduced if some type of automation system were introduced? (4) What would be the relative costs and returns of partial mechanization? (5) What risk factors, uncertainties, and non-cost items should be considered?

Making the Right Decision

Perhaps the importance of making the right decision concerning mechanization can best be understood if we trace a chain of events resulting in financial loss. Consider this hypothetical situation. A profit-conscious manager of a small business firm looks enviously at the success of a competitor who has mechanized. Recognizing the presence of low costs and high profits, he comes to the conclusion that he too should mechanize, lower costs, and increase his profits. So, he installs machinery throughout his plant to minimize the use of human labor. He may soon discover that his old volume is too small to completely utilize the new equipment. Probably at this stage of change his cost per unit is higher than before. His solution (he thinks!) is simply to increase volume to the point where unit costs are lowered. As he increases output to the capacity of the equipment he finds he must increase storage area, widen his market area, increase his advertising budget, and so on. Let us anticipate that with these steps he has increased volume and lowered costs considerably. But now, in a newly-widened market, he is in competition with other large-scale plants that may have even lower costs and are able to underbid him. No longer does he hold the semi-monopoly selling position that many small firms are able to enjoy. His only choice now is to expand production even more, to further lower his costs, so that he can meet competition. By following this path he eventually arrives at a position where his costs are low enough for him to compete, and he is able to hold his own. If at any point along the way he is unable to take the next step, however, the outcome could be financial loss or even bankruptcy. Most important, he needs investment capital, and this in

many firms is the bottleneck on the expansion route. This whole chain of expansion came as a result of his decision to add labor-saving equipment. The moral here is to consider all possible side or after-effects before making this important decision.

Of course, this example is an over-simplification and deliberately exaggerates the pessimistic side. But it does illustrate the importance of weighing all relevant factors, including capital needs, before making the automation decision. The final conclusion should be made on the basis of anticipated lowered costs, taking into account risk and uncertainty items. Versatility of resources, dependability of labor, and availability of credit all need to be considered. In many plants it will be found that certain operations or departments should be fully automated. In others, human labor will hold the relative advantage. In still others, lowest costs result from a combination. Our recommendation is to budget various alternatives and select the one showing the greatest cost advantage for size of operation under consideration.

To properly evaluate alternative methods of operation, one needs a thorough understanding of our economy's most valuable resource—man. What are his relative advantages and limitations? What jobs can he perform best? Where can he be used most effectively? Where would a machine be an improvement? Even more important, what costs are involved in using each type of labor?

Man as a Source of Labor

From a detached point of view, let us examine human labor. Man's labor capacities may be conveniently divided into three classes: (1) physical, i.e., body exertions, (2) dexterous, i.e., skillful use of certain parts of the body, and (3) mental, i.e., capacity to think.

A critical evaluation shows that as a source of energy, man is poor. Over a sustained period of time man generates less energy than the motor of an average household refrigerator, therefore, it is uneconomical to use him primarily as a source of power. Used at repetitive tasks, man is even less effective. Man, however, is useful as a source of power if his primary work is dexterous or mental and the power requirements are occasional.

A higher level of work performed by man is the type requiring high dexterity. Skillful use of the hands or eyes are examples. Here,

because of the manipulative ability of his hands, man proves to be much more useful. It must be admitted, however, that if dexterity alone is required, a monkey or squirrel may in some instances be more productive than man. Scanning with the eyes (visual observation for inspection) is another dexterous skill and man excells in this area.

The highest type of labor done by humans is the type requiring a high degree of mental performance. The human brain, with its ability to reproduce itself, and housing over 10 billion cells, is much more complex than the most complicated machine. No animal has been able to compete with man in the area of mental activity. The development of high speed computers leads many people to believe that a substitute has been found for brain power. In reality, however, these machines do not have the capacity for original thinking, but rather serve as tools for man and enable him to multiply his mental powers just as bicycles and trucks enable him to multiply his walking and carrying powers.

Thus, man's mental powers remain virtually unchallenged. As newer techniques are developed, he is continually being drawn into this area where he has the greatest relative advantage. It appears, then, that this type of human labor will continue to play an important role in coming generations.

Much of man's labor involves doing all three types of work simultaneously. An employee of a meat-packing plant who inspects, stamps, weighs, packages, and prices cuts of meat is performing physical, dexterous, and mental work. Although the total job of this worker is complex, there is little doubt that any or all of the chores could be performed by machines. It is also possible that, under certain specified conditions, they may be done at a cheaper rate when machines are used. Machines would be best adapted to doing repetitive jobs of stamping the meat, helping mark the cost, and sealing the package. Conveyors might be used to reduce much of the physical labor in transporting the product to and from the workers. Although these labor-saving devices may be employed to reduce physical labor, those operations requiring original thinking must be reserved for man.

The above illustration, serves to accent one of the key ideas to be discussed. Man's advantage lies in his capacity to do original thinking. He is able to perform the highest caliber of work as well as being capable of jobs requiring dexterous skill and physical exertion. Our general principle of selection will be to recommend the resource having the

lower cost and to use each resource where it has the greatest relative advantage.

Guides for Using Machines

More specific guides can help us decide when to use human labor and when to substitute machines. Machines may be used to advantage for a given job if:

1. There is a machine developed to do the job.
2. The work to be done is physical, repetitive, and simple.
3. Volume is high and steady.
4. Wage rates are high.
5. Human labor is inadequate.
6. It is necessary to have precise future cost estimates.
7. Investment money or credit is available.

These conditions are generalizations and bear explaining. It goes without saying that machines have not been developed for every type of work. Until a satisfactory machine is developed, it is difficult even to speculate about how the work should be done. Thus, other forms of labor will continue to be used until a machine is developed.

The second condition states that machines are preferable in physical and repetitive work. Man is inefficient for purely physical work and this factor is more critical now than ever before. This condition also states that if a machine is to do a given piece of work successfully, the work must be simple. However, machinery now performs remarkably complex operations. These complicated jobs may be accomplished by breaking the job down into fairly simple steps so separate machines or units of the machine may handle each step.

Volume of production is perhaps the most important single factor to consider when making decisions on the type of labor to use. It plays a dominant role in almost every aspect of manufacturing, processing, and marketing. Why is volume so important? The amount of human labor needed varies with the volume, i.e., the larger the output, the more labor is required. Therefore, human labor is usually classified as a variable cost. Machine costs are largely fixed. With a given set of machinery

or equipment, volume may vary from nothing to maximum capacity with little effect on costs. The "dirti five" nature of machine costs permit stability. In this case, DIRTI stands for depreciation, interest, repairs, taxes, and insurance. Fixed costs per unit may be lowered by the simple expedient of increasing volume. The greater the volume of output for a given investment in capital good, (in this case equipment), the lower will be the cost per unit. Thus, firms with large volumes are more inclined to choose labor-saving machines than small firms with low volumes.

To illustrate this point, let us look at a recent study conducted at Oklahoma State University on methods of handling eggs. It was reported that plants with a "hand" method of candling eggs had lower costs than plants using "machine" methods up to volumes of 125 cases per hour. Wages were standardized at $1.25 per hour.) In plants with larger capacities, mechanized candling methods proved to have the lower relative costs.

The above discussion assumes labor costs to be completely variable. If output is to be increased in a labor-utilizing plant, the present workers may be worked longer or additional laborers may be employed. In either case, labor costs have been increased and are variable. It is not, however, so easy to adjust employment downward in order to decrease production. Institutional factors such as contracts, government programs, and labor unions make it difficult to have perfect mobility of labor. Many plants cannot reduce the size of their labor force for this reason. This in effect tends to make labor a fixed cost as output decreases and increasing per unit cost is the result.

Volume is also affected by seasonality of production. Industries having seasonal work benefit more from using variable resources than those with a steady month-to-month output. In the case in point, human labor would be indicated as being preferable to high investment equipment.

The number of shifts worked per day could also be a determining factor. A plant working one eight hour shift per day is more likely to utilize human labor than a plant with multiple shifts. Again this emphasizes that high volume is associated with fixed costs, and low volume with variable costs.

Another item to consider is the prevailing wage rate. Where the supply of labor is great, the wage rate is low. The extensive use of human labor in under-developed countries illustrates this point. On

the other hand, in areas where labor is scarce and expensive, the relative advantage of machines is apparent. The history of industrializatoin reveals that increases in wage rates have promoted transitions toward mechanization.

The egg handling study mentioned earlier shows the effect wage rates have on the feasibility of machine use. It was found that a $.25 per hour increase in the wage rate would result in more of the smaller plants moving to automation. At a wage of $1.25 per hour the breakeven point of machines vs. labor was 125 cases per hour. This compares with a breakeven point of 110 cases per hour at the higher wage rate of $1.50. The net result of such a wage increase would be to induce those firms in a range of 110 to 125 cases per hour capacity to purchase automatic egg candlers.

A decrease in wage rates may not have the opposite effect. If a firm has invested in machinery it cannot readily revert to the use of human labor if wages decline. The firm has committed itself to a group of fixed costs and must continue to pay them. This is another reason to be cautious in mechanizing; sometimes it is virtually impossible to move from machines to labor.

Reliability in the labor supply is essential if output is to be consistent. This is extremely important where there is a steady demand to be filled or if the products are perishable. Although sufficient labor supply is guaranteed in most industries, this is not always so. In such cases it becomes necessary to substitute machine for human labor. This factor should be given primary consideration in making decisions relative to degree of mechanization.

The possibility of making precise estimates of future costs are greatly enhanced when machines are substituted for human labor. At the time equipment or machines are purchased it is possible to budget yearly fixed costs over the life of the machine. The instability of wage rates prohibits precise estimation of labor costs over time.

The last major point to consider is the availability of adequate financing. Although all of the above conditions may be satisfied, it may still be unwise to convert to mechanization because of the lack of investment capital. Small firms may err in tying up operating capital in expensive machinery, thus weakening other phases of the business enterprise. However, with adequate credit available, a firm may or may not mechanize contingent upon other factors involved.

Guides for Using Labor

The previous discussion enumerates conditions under which it is advantageous to use machines as a source of labor. This is by no means an exhaustive list, but is an effort to point out the most important factors that must be considered. Similar conditions may be developed under which it would be advantageous to use human labor. In many instances, these conditions are the opposites of those listed as advantages for machines.

In general, human labor is adaptable to jobs requiring dexterity, ingenuity, and original thinking. More specifically, human labor may be advantageously used when:

1. There is no machine available.
2. There is a low volume of output.
3. The labor supply is adequate.
4. Wage rates are satisfactory.
5. There is a lack of investment capital.
6. Versatility and adaptability is essential.

This does not mean, however, that no machines should be used if these conditions prevail. Conversely, all available machinery should be used to assist man in expanding his capacities. The chief question with which we are concerned is whether or not investment in additional machines is warranted from a cost point of view.

Human labor is highly desirable and useful in many small plants. This is especially true if volume is not large enough to justify an investment in mechanical equipment. Investing capital in labor-saving machines without sufficient volume to use them to capacity is one of the surest paths to financial loss.

In densely populated areas where there is plenty of low cost labor available, a large portion of the work may be done by man. In the South, for example, one might advantageously hire human labor for a certain job whereas the same job might command a machine in a northern city where wage rates are higher.

Small plants with low volume need a versatile input resource capable of performing more than one job. Man is adaptable. In a small shoe factory, either a man or a machine can make the shoes. However, when the day's quota of shoes have been made, the machine is no

longer useful. On the other hand, the man can be used to package the shoes, load and unload trucks, and perform myriad other tasks. This is an important factor to consider when making the final decision. Happily, most situations do not require an either-or solution and we find men and machines as the least-cost combination.

Many equipment companies lease machines to prospective users. It is possible that a leasing arrangement could serve as an alternative to buying equipment. If, however, neither investment capital nor credit are available, it is advantageous to retain human labor.

Future Role of Labor

The industrial revolution in which we are living is one of the most interesting changes that has affected man since the beginning of time. Mechanization does not come at the same rate of speed to all industries nor does it mean that eventually we will be able to operate our entire economy by pushbutton. As in the past, we can expect man to be used for fewer and fewer jobs, but this is part of our changing times.

Let us not underestimate man as a resource in production. In many plants he is still the key to low cost operation, but needs to be used in the role where he has the greatest relative advantage.

Land Ownership In Oklahoma

L. A. Parcher

Here are the highlights of the findings of a land ownership survey reported by Roger W. Strohbehn and Gene Wunderlich in *Land Ownership in the Great Plains, 1958,* Agricultural Research Service, U.S. Department of Agriculture, Statistical Bulletin No. 261 and by Larence E. Osborn, *Land Ownership in Oklahoma,* unpublished M.S. thesis, Oklahoma State University, 1961. Statistical Bulletin No. 261 dealt in state totals. Osborn, using data compiled by the Agricultural Research Service, separated these data into areas of the state which were deemed to be relatively homogenous with respect to ownership and land type.

It is anticipated that a bulletin incorporating the statistical tables will be issued in the near future.

Highlights

1. How much land and how many owners?

There are about 38.4 million acres of farm and ranch land in Oklahoma held in private ownership by 108,333 owners.[1] Thirty percent of this land is cropland, 64 percent grazing land, and six percent other land.[2] Owners placed the value of their land at $2.6 billion.

2. Who owns the land?

Individuals own 97.3 percent of the farm and ranch land in the state. The only area where non-individual ownership appears to be

[1]These figures exclude Tulsa County and Oklahoma County.
[2]Other land is woodland not pastured, farmsteads, waste, etc.

significantly high is Area 7a where corporations own nearly 13 percent of the land. (See Figure 1 for areas.) Agricultural corporations, particularly, appear to have concentrated in this area with holdings of about 800,000 acres, much of it being pasture land.

On the whole, however, corporations of all kinds as well as institutions are unimportant land owners. Only 0.4 percent of all land owners fit into either of these categories and they own but 2.7 percent of the privately owned farm and ranch land in the state.

Figure 1. Economic Areas.

3. Does this ownership include all the rights in the land?

Slightly more than 67 percent of the land in the state is reported by owners as being held in the surface interest only. Ownership of the surface only is particularly high in Areas 6, 7a, and 7b. Only in Area 8b do we find more than half the land being held under complete title. In this area, 76.7 percent of the land is held with all mineral rights.

4. What is the marital status of individual owners?

Man and wife combination is the most important ownership group, comprising nearly 54 percent of all owners. They own nearly 50 percent of the land and 55 percent of the land value. Eleven percent of the land is held by unmarried men and women.

Man and wife ownership is noticeably higher in Areas 4, 5, and 9 where they own nearly 60 percent of the land. Land owned by single people is relatively high in Area 2 where they own 20 percent of the land.

Partnerships, corporations, and those of unknown marital status own the remaining 39 percent of the land in the state.

5. What is the entrepreneurial status of owners?

About 42 percent of all individual land owners in the state are full-owner operators.[3] They own and operate 28 percent of the land and own about the same amount of the land value. This entrepreneurial class of owners appear to be relatively most important in Area 8b where 73 percent of all owners are owner-operators of 70 percent ot tne land.

Owners who operate additional land by renting from others own 22 percent of the land and are a relatively important group in Area 3 where they own nearly 37 percent of the land.

Among these entrepreneurial groups ,the part-owner-operator landlord[4] is the "big" landholder. While only four percent of all owners fit into this category, they own 14 percent of all land. This category is especially important in Area 7b where they comprise four percent of all owners, but own 37 percent of the land.

Operator landlords[5] comprise 12 percent of all the individual owners in the state and own 19 percent of the land. This group is most important in Area 7a where it owns 28.5 percent of the land, and least important in Area 8b where it owns 6.5 percent of the land.

Landlords[6] hold 17 percent of the individually owned land in the state. They are most predominate in Area 2 with 27 percent of the land, and least predominate in Area 7a where they own but six percent.

6. How did these owners acquire ownership?

As a rule owner-operators acquired their land by purchase from non-relatives, both part and full owner-operators acquired nearly 64

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[3]He farms all the land he owns and owns all he farms.
[4]He farms part of the land he owns, but rents out land to others as well as rents from others.
[5]He operates only a part of the land he owns and rents out the rest.
[6]He rents out all the land he owns.

percent of their land by this method. An additional 18 percent was purchased from relatives. Acquistion by gift and inheritance was a relatively important factor in the ownership of land by both operator and non-operator landlords. Operator landlords acquired roughly a fourth of their land either by gift or inheritance and non-operator landlords acquired nearly 40 percent in this manner.

When owners are classified by marital status we find that most land owned by single men and husbands and wives was acquired by purchase. On the other hand a relatively high proportion of the land owned by single women either alone or in partnership was acquired by inheritance. Partnerships in general showed a disproportionately high rate of acquistion by gift and inheritance.

7. Is ownership unrestricted?

Nearly 60 percent of all owners hold their land in full ownership. They own 58.5 percent of the land. Nearly one fourth of all owners hold their land under a mortgage. About 14 percent of the land is held in some form of partnership. Land held under a contract for deed or purchase contract is unimportant in Oklahoma with less than one percent of the land so held.

The amount of land held under a mortgage agreement appears to be most prevalent in Area 4. In this area 32.3 percent of the land is mortgaged as compared to a state average of 20 percent. The proportion of the land that is fully owned is highest in Area 7b.

Except for Area 1 where seven percent of the owners hold their land in a life estate, this form of ownership varies but little within the state.

8. What is the mortgage debt situation?

Full-owner-operators have the highest ratio of mortgage debt to the value of their land. They own 28 percent of the value of the land but have 39 percent of the mortgage debt. In Areas 7a, 7b, and 8a, this group of owners apparently have the highest debt ratio to value of their land. In Area 7a they own 24 percent of the value of land and have 58 percent of the debt; 7b, 42 percent of the value and 72 percent of the debt; and 8a, 36 percent of the value and 61 percent of the mortgage debt. Both full-owner-operator landlords and non-operator landlords, relatively, were most debt free, owning about 18 percent of the land

value and having only eight percent of the debt. Landlords in Area 6, while owning 18 percent of the value of the land, had only 1.3 percent of the mortgage debt.

9. What do owners do?

Nearly 43 percent of the land owners in Oklahoma are active farmers and they own nearly 49 percent of the land. Active farmers own relatively more land on the west side of the state in Areas 1, 2, and 4 and less in Areas 5, 7a, and 8b, the central and northeast.

Active business and professional people and owners classed as "other"[7] own about 28 percent of Oklahoma land. While business and professional people seem to have made heavy acquisition of land in Areas 9, 7a, and 6, "other" owners have tended to concentrate in Area 7b as well as Areas 6, 7a, and 8b.

In the retired category, farmers own slightly more land than do non-farmers—4.0 percent as compared to 3.4 percent.

Owners in the retired category hold relatively more land and are more numerous in Areas 2, 4, and 5 where some of the more productive land in the state is found and in Area 8b, the "retirement area" of the state. Retired non-farmers in particular have shown a preference for this latter area.

10. What type of land do they own?

Active farmers hold the larger portion of the state's cropland. While this group owns 48.9 percent of all land they own 53.4 percent of the cropland. This relationship between all land owned and cropland owned is most striking in Areas 7a, 7b, 8b, and 9—in general the eastern and southern part of the state. In these four areas the active farmer owns less than 40 percent of all land, but more than 53 percent of the cropland.

Business and professional people have concentrated more on "other" land and pasture land. While this group owns 14.0 percent of all land in the state, they own 32.6 percent of the "other" land and 15.4 percent of the pasture land. Their acquisition of "other" land has been particularly disproportionate in Area 3 (20 percent of all land and 45 percent of "other" land), Area 6 (20 percent and 67 percent), Area 7a (21 percent and 44 percent), and Area 9 (29 percent and 56 percent).

[7]Clerks, mechanics, skilled laborers, students, etc.

For the state as a whole, retired owners, both farmers and non-farmers, hold more than their proportional share of cropland. Although retired people own but 11 percent of all land, they hold nearly 15 percent of the cropland. Retired farmers, in particular, within the various areas of the state have more than a proportional share of cropland as compared with all land they own.

11. How old are landowners in the state?

More than a fourth of the landowners in Oklahoma are 65 years old or more. Eight percent are 75 and over. However, owners in the 55 to 64 years age group hold the most land, 27 percent. Land held by this age group is particularly high in Areas 7b and 8b where they hold about 45 percent of the land.

Young owners, age 35 and under, hold less than four percent of the land in the state. The proportion of land owned by the younger age group, however, was particularly high in Area 8a, the Arkansas River Valley area. Here the proportion of land held by young owners was nearly four times the state average for the group.

12. Is multiple ownership important?

Slightly more than 80 percent of all landowners in the state own only one farm. However, 17 percent of the operating and non-operating landlords own five or more farms each.

13. What will happen in the event of the owner's death?

Less than 25 percent of all landowners have wills. The older the landowner, the more likelihood of a will. Even so, only about half the owners, 75 years old or more, reported they had made wills. In the 65 to 74 years age bracket, only 36.4 percent had made wills. Owners in the 25 to 34 year age group were the most negligent about making wills. However, it would appear that the younger owners who had the most land were not so negligent since the five percent who had made wills, held 48 percent of the land owned by this group.

Table 1.—Monthly and Season Average[1] Prices Received by Farmers for Oklahoma Farm Products.
(Dollars)

		Wheat	Corn	Oats	Barley	Rye	Grain Sorghum	All Hay	Alfalfa Hay	Wild Hay	Cotton Lint	Cotton Seed	Soy Beans	Pea-Nuts
1959		1.77	1.09	.64	.74	.90	1.52	18.30	23.47	14.38	.279	37.60	1.80	.095
1960**		1.74	1.08	.64	.73	.89	1.41	20.00	24.32	15.79	.283	40.80	1.86	.100
1960	Aug.	1.72	1.19	.65	.72	.88	1.49	18 60	23.00	14.60	--	----	1.82	---
	Sep.	1.78	1.05	.65	.73	.95	1.40	19.40	23.80	15.50	.311	40.00	1.80	.098
	Oct.	1.78	1.03	.65	.73	.95	1.38	19.90	24.00	16.30	.296	40.00	1.79	.100
	Nov.	1.79	1.04	.65	.74	.91	1.38	20.60	25.30	16.50	.279	41.00	1.82	.100
	Dec.	1.80	1.06	.66	.75	.89	1.40	21.10	26.00	16.50	.267	42.00	1.83	.095
1961	Jan.	1.83	1.10	.67	.77	.91	1.44	21.60	26.50	17.00	.261	42.00*	1.95	.098
	Feb.	1.87	1.11	.66	.79	.90	1.51	21.70	27.00	17.00	.233	43.00*	2.19	.096
	Mar.	1.85	1.12	.66	.79	.85	1.54	20.50	25.50	16.00	.260	44.00	2.26	.100
	Apr.	1.76	1.10	.62	.74	.84	1.53	20.00	25.00	15.50	.276	----	2.48	.102
	May	1.76	1.10	.61	.74	.81	1.57	18.40	21.50	15.00	.282	----	2.70	---
	June	1.71	1.12	.59	.73	.84	1.63	18.10	21.50	14.50	.295	----	2.32	---
	July	1.74	1.18	.60	.76	.96	1.75	17.30	21.00	13.50	---	----	2.29	---
	Aug.	1.82	1.16	.62	.79	.96	1.76	17.70	21.50	13.50	---	----	2.26	---

		Cattle	Calves	Sheep	Lambs	Hogs	Wholesale Milk	Butter-fat	All chickens	Commercial broilers	Eggs	Turkeys	Wool	Alfalfa Seed	Sweet Potatoes
1959		22.20	26.90	7.00	19.20	14.20	4.58	.53	.141	.151	.272	.234	.34	19.80	2.30
1960**		18.60	22.10	6.60	18.40	14.80	4.60	.53	.149	.149	.306	.241	.36	23.00	2.65
1960	Aug.	17.70	20.90	5.50	17.20	16.00	4.35	.53	.150	.160	.282	.22	.36	22.60	2.75
	Sep.	17.60	20.50	5.50	16.60	15.40	4.60	.54	.143	.155	.327	.23	.36	23.50	2.35
	Oct.	17.10	20.50	5.40	16.30	16.40	4.75	.55	.143	.155	.394	.24	.34	23.60	2.55
	Nov.	17.80	21.50	5.60	16.30	16.30	4.80	.55	.135	.153	.433	.25	.34	23.50	2.60
	Dec.	19.00	22.60	6.10	16.00	16.20	4.95	.55	.139	.155	.460	.26	.33	22.50	2.50
1961	Jan.	18.90	23.30	7.00	16.00	16.30	5.00	.54	.143	.160	.395	.23	.33	22.50	2.65
	Feb.	19.80	23.50	7.00	16.20	16.80	4.85	.54	.153	.165	.360	.22	.33	23.50	2.80
	Mar.	19.80	23.80	7.00	16.00	16.40	4.50	.54	.146	.160	.308	.22	.35	22.50	2.90
	Apr.	20.00	24.10	6.50	16.70	16.30	4.30	.54	.140	.150	.282	.22	.34	23.10	---
	May	19.10	23.30	5.00	16.10	15.70	4.10	.54	.136	.145	.284	.22	.36	----	---
	June	18.90	22.70	4.60	15.70	15.40	4.15	.54	.124	.130	.275	.21	.36	----	---
	July	18.30	22.30	5.00	15.40	16.20	4.15	.54	.116	.120	.296	.19	.36	23.00	---
	Aug.	18.90	23.00	3.60	15.40	16.60	4.20**	.54	.118	.125	.301	.18	.35	25.00	---

SOURCE: *Prices Received by Farmers*, Agricultural Marketing Service, U.S.D.A., Oklahoma City, Oklahoma, Monthly Releases or *Agricultural Prices*, A.M.S., U.S.D.A., Washington, D. C.

[1] Annual prices for crops are season average prices for the crop year weighted by marketings. Annual prices for livestock and products are season average prices for the calendar year weighted by marketings.

* Revised ** Preliminary

Table 2.—Index Numbers of Prices Received by Farmers for Oklahoma Farm Products.[1]
(Percent of 1910-14 Average)

		Wheat	Corn	Oats	Barley	Rye	Grain sorghums	All Hay	Cotton-lint	Cotton-seed	Sweet Potatoes
1959		208	175	143	136	109	142	192	248	207	200***
1960		209	172	150	128	109	125	231	248	199	206
1960	Aug.	200	183	145	120	102	124	211	265	194	223
	Sep.	206	162	145	122	110	116	220	275	204	191
	Oct.	206	158	145	122	110	115	226	261	204	207
	Nov.	208	160	145	124	106	115	234	246	210	211
	Dec.	209	163	148	125	103	116	239	236	215	203
1961	Jan.	212	169	150	129	106	120	245	235	215	215
	Feb.	217	171	148	132	105	126	246	206	220	227
	Mar.	215	172	148	132	99	128	232	230	225	235
	Apr.	204	169	139	124	98	127	227	244	225	---
	May	204	169	136	124	94	131	209	249	225	---
	June	198	172	132	122	98	135	205	261	225	---
	July	202	182	134	127	112	145	196	261	225	---
	Aug.	211	178	139	132	112	146	201	261	225	---

		Cattle	Calves	Sheep	Lambs	Hogs	Wholesale milk	Butterfat	All chickens	Eggs	Wool
1959		460	458	150	322	203	238	226	142	155	189
1960		394	380	136	307	211	240	228	157	178	207
1960	Aug.	366	350	119	296	227	226	226	160	158	210
	Sep.	364	343	119	286	219	239	231	152	184	210
	Oct.	354	343	117	281	233	247	235	152	221	198
	Nov.	369	360	121	281	232	249	235	144	243	198
	Dec.	393	379	132	272	227	257	231	148	258	192
1961	Jan.	391	390	152	275	232	260	231	152	222	192
	Feb.	410	394	152	279	239	252	231	163	202	192
	Mar.	410	399	152	275	233	234	231	155	173	204
	Apr.	414	404	141	287	232	223	231	149	158	198
	May	395	390	108	277	223	213*	231	145	160	210
	June	391	380	100	270	219	215	231	132	154	210
	July	379	374	108	265	230	215	231	124	166	210
	Aug.	391	385	78	265	236	218	231	126	169	204

SOURCE: Annual data are averages of months for calendar years and are compiled by Dept. of Ag. Econ., Oklahoma State University, from data supplied by Agricultural Marketing Service, U.S.D.A., Oklahoma City, Oklahoma, and Washington, D. C. For previous years, see Oklahoma Agri. Exp. Sta. Publication P-297, Prices Received by Oklahoma Farmers, 1910-1957.

[1] For the index of purchasing power of a unit of an individual commodity in terms of commodities used in farm production and family living, interest, taxes and wages, divide the index of price received by Oklahoma farmers (in this table) by the index prices paid by United States farmers in Table 4 for the same month and multiply by 100.

* Revised ** Date not available *** 9 months average

Table 3.—Price Indexes of Groups of Oklahoma Farm Products.
(Percent of 1910-14 Average)

		All farm products	All crops	Feed grains	Feed grains and hay	Cotton and cottonseed	Oil bearing crops	All livestock & L.S. Prod.	Meat animals	Dairy products	Poultry and poultry prod.
1959		267	219	158	174	243	262	320	400	254	157
1960		255	220	153	185	243	246	294	349	257	178
1960	Aug.	246	216	156	180	256	238	278	330	247	163
	Sept.	251	223	145	175	266	256	281	326	258	181
	Oct.	252	221	143	176	254	260	286	322	264	210
	Nov.	256	219	144	179	241	262	295	334	265	225
	Dec.	261	218	146	183	233	255	309	351	270	238
1961	Jan.	261	221	150	188	232	260	305	352	270	210
	Feb.	262	218	152*	190	206	259	309	366	270	197
	Mar.	260	221	154	186	228	268	302	365	253	173
	Apr.	257	217	150	181	241	272	300	368	246	160
	May	252	218	151	175	245	273	290	353	240*	160
	June	250	216	153	176	256	272	286	348	241	154
	July	250	219	161	178	256	272	283	342	242	160
	Aug.	256	225	161	180	256	272	290	352	244	162

Purchasing Power Indexes of Groups of Oklahoma Farm Products.[1]
(Percent of 1910-14 Average)

		All farm products	All crops	Food grains	Feed grains	Feed grains and hay	Cotton and cottonseed	Oil bearing crops	All livestock & L.S. prod.	Meat animals	Dairy products	Pltry. and pltry. prod.
1959		90	74	70	53	59	82	88	107	134	86	53
1960		84	73	70	51	62	81	82	98	117	86	60
1960	Aug.	83	72	67	52	60	86	80	93	111	83	55
	Sept.	84	75	69	49	59	89	86	94	109	87	61
	Oct.	85	74	69	48	59	86	88	96	108	89	71
	Nov.	86	74	70	48	60	81	88	99	112	89	76
	Dec.	88	73	70	49	61	78	86	104	118	91	80
1961	Jan.	87	73	70	50	62	77	86	101	117	90	70
	Feb.	87	72	72	50	63	68	86	102	121	88	65
	Mar.	86	73	71	51	62	75	89	100	121	84	57
	Apr.	85	72	68	50	60	80	90	99	122	81	53
	May	83	72	68	50	58	81	90	96	117	79*	53
	June	83	72	66	51	59	85	91	95	116	80	51
	July	83	73	67	54	59	85	91	95	114	81	53
	Aug.	85	75	70	53	60	85	90	96	117	81	54

SOURCE: Compiled by Dept. of Ag. Econ., Oklahoma State University, from data supplied by Agricultural Marketing Service, U.S.D.A., Oklahoma City, Oklahoma, and Washington, D. C. For previous years, see Oklahoma Agri. Exp. Sta. Publication P-297, Prices Received by Oklahoma Farmers, 1910-1957.

[1] The ratio of prices received by farmers to prices paid by farmers for commodities used in farm living and production, interest, taxes and wage rates. For individual commodities, see footnote 1 of Table 2.

* Revised ** Preliminary.

Table 4.—Index Numbers in the United States, Index of Demnad Deposits in Oklahoma, and Oklahoma Price Ratios.

		United States index numbers of:					Oklahoma price ratios[4]			
		Prices received by farmers (1910-14=100)	Prices paid by farmers (1910-14=100)	Wholesale prices (1910-14=100)	Industrial manufacturing payrolls[1] (1947-49=100)	Index of demand deposits in Oklahoma[2 3] (1923-25=100)	Hog corn	Egg feed	Turkey feed	Milk feed
1956		230	278	256	161.4	297.4	10.4	9.7	7.2	1.695
1957		235	286	264	162.7	290.9	13.6	9.2	6.7	1.757
1958		250	293	268	148.7	313.0	16.9	10.2	6.9	1.968
1959		240	297	268	167.2	334.5	12.6	8.7	6.9	1.877
1960		238	299	269	170.2	326.5	13.3	10.3	7.6	1.902
1960	Aug.	234	298	267	169.2	331.5	13.4	9.2	7.2	1.793
	Sept.	238	298	267	172.5	327.1	14.7	10.8	7.6	1.969
	Oct.	241	297	270	170.5	328.1	15.9	13.1	8.0	2.047
	Nov.	241	297	270	166.2	330.9	15.7	14.4	8.3	2.037
	Dec.	242	298	270	160.6	354.4	15.3	15.2	8.6	2.074
1961	Jan.	241	301	270	158.5	354.1	14.8	12.7	7.4	2.024
	Feb.	244	302	270	157.1*	341.9	15.1	11.7	7.1	1.997
	Mar.	243	302	270	158.2	337.9	14.6	9.9	7.1	1.853
	Apr.	239	302	270	160.3	339.2	14.8	9.2	7.2	1.814
	May	236	302	267	164.8	332.5	14.3	9.1	7.1	1.711
	June	234	300	267	170.8	339.0	13.8	9.0	6.8	1.753
	July	237	300	265	169.8**	350.9	13.7	9.4	6.0	1.734
	Aug.	241	301	267	----	----	14.3	9.5	5.5	1.748

SOURCE: Indexes of U.S. prices received and prices paid by farmers and indexes of U.S. wholesale prices, from *Agricultural Prices*, A.M.S., U.S.D.A., Washington, D. C. Indexes of demand deposits in Oklahoma, calculated by Dept. Agri. Econ., Okla. Agri. Exp. Sta. from data furnished by Federal Reserve Board, Washington, D. C. Indexes of industrial manufacturing payrolls, from U. S. Department of Labor, Bureau of Labor Statistics, Washington, D. C.

[1] Unadjusted for seasonal variation.

[2] Demand deposits of Oklahoma members banks of the Federal Reserve System located in places under 15,000 population.

[3] Index numbers based on net demand deposits prior to 1936 and upon gross demand deposits since that date. For a discussion of this index see CURRENT FARM ECONOMICS, Oklahoma Agricultural Experiment Station Series 49, Vol. 13, Nos. 1 and 2. Feb.-Apr., 1940, p. 41.

[4] The number of bushels of corn or pounds of feed which one unit of the commodity (100 pounds of hogs, one dozen eggs, one pound of turkeys or milk) will purchase. Prices used are the official A.M.S. estimates of prices received by Oklahoma farmers except for commercial feeds or ingredients which are official A.M.S. estimates of prices paid by Oklahoma farmers. These ratios are computed on the basis of fixed rations and are not directly comparable with ratios computed from other rations. The composition of each ration used is available upon request.

* Revised. ** Preliminary.

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